

Hepatic brucellosis detected by ¹⁸F-FDG PET/CT

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Abstract

A 52-year old woman with fever of unknown origin underwent fluorine-18-fluorodeoxyglucose (¹⁸F-FDG) positron emission tomography/computed tomography (PET/CT) scan for further evaluation. A clinical history of cervical cancer (CIS) operated 20 years ago was documented. Two foci in the right lobe of the slightly enlarged liver presented increased ¹⁸F-FDG uptake. Visceral brucellosis was diagnosed via blood culture. The patient received anti-brucella therapy and recovered rapidly, the liver lesions diminished on control CT.

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Introduction

Brucellosis is a worldwide, chronic infectious disease caused by small aerobic, non-motile, Gram-negative coccobacilli of the genus *Brucella*. Zoonoses are transmissible diseases between vertebrate animals and humans. Brucellosis is the most significant and common bacterial zoonosis. Goats and ewes are the preferred hosts for *Brucella*. *B. melitensis* infection causes abortion, stillbirths and the birth of weak offspring in animals and is the most virulent *Brucella* species for humans, responsible for a severely debilitating and disabling illness that results in high morbidity with low mortality. *B. melitensis* has been controlled in most industrialized countries; however, it remains endemic in some areas, such as the Mediterranean region [1].

The main sources of *Brucella* are infected animals or their products, such as milk and meat. Routes of transmission of the infection to humans include direct contact with infected animals, infected aerosols inhaled or via the ingestion of unpasteurized dairy products [2].

Brucellosis is a systemic disease in which any organ or body system can be involved. The incubation period varies between 1 and 5 weeks, and *Brucella* infection may be asymptomatic or symptomatic. The onset of symptoms is acute or insidious. The acute form is the typical form of brucellosis. Almost all patients have a history of fever accompanied by weakness, malaise, headache, back-ache, anorexia, weight loss, myalgia, and arthralgia. Splenomegaly and hepatomegaly are frequently found [2].

Case presentation

A 52-year old woman presented in July 2020 with one month lasting fever, weakness, loss of appetite and abdominal discomfort. Blood cell count and C-reactive protein (CRP) were in the normal range, the liver parameters were slightly elevated: ASAT (GOT)=62U/L (normal 0-31), ALAT (GPT)=85U/L (normal 0-34), gamma-GT=66U/L (normal 0-38). Medical history revealed cervix carcinoma treated in 2000 and chronic lumbago.

Fluorine-18-fluorodeoxyglucose (¹⁸F-FDG) positron emission tomography/computed tomography (PET/CT) was performed due to evaluation of fever of unknown origin (FUO). One larger ¹⁸F-FDG avid lesion in segment VIII of the right liver lobe presented with standardized uptake value (SUV)=7.6, at least one small satellite could be observed (Figure 1a). This lesion measured 2.0cm on PET/CT (Figure 1b, c). Later on, various blood cultures were reported positive for *Brucella melitensis*. The patient remembered to have participated in a barbecue at a family celebration in her Bosnian home village in spring 2020, for which meat of sheep and goat had been prepared.

The patient received therapy with Vibramycin and Rifoldin, her symptoms consecutively diminished. On monthly CT control imaging the principal lesion measured longest

1.3cm (Figure 2a) - with some bizarre configuration - and 8mm in September 2020 (Figure 2b), further controls by sonography could not detect it any more. Latest contact with our hospital was in July 2022, she had clinically completely resolved and laboratory parameters were negative for infection. Also the liver enzymes had normalized.

Discussion

Febrile symptoms can be caused by a large variety of infectious agents and other conditions. Brucellosis although being

rare in central Europe is a possible germ causing prolonged fever, anamnestic information might be leading for diagnosis. In our case - not before having knowledge of the blood culture results - a specific interrogation aimed at possible contagiation was realized. In conclusion, in central Europe *Brucella melitensis* is not endemic, but can seldomly be imported from (nearby) mediterranean countries.

Fluorine-18-FDG PET is frequently used to investigate fever of unknown origin (FUO). Hepatic brucellosis is considered a relatively rare complication of brucellosis [3]. Brucellosis mostly presents with ¹⁸F-FDG avid spinal lesions [4-6] as in cases with spondylodiscitis; but brucellosis can also be detected when visceral lesions are evaluated for malignancy [7, 8]. As our

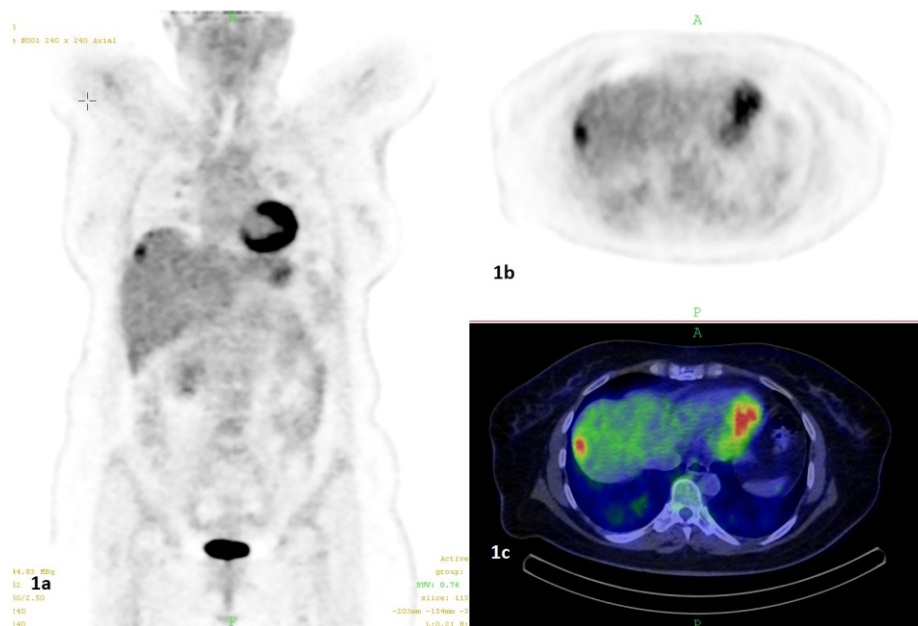


Figure 1. A 52-year old woman presented in July 2020 with one month lasting fever, weakness, loss of appetite and abdominal discomfort. Blood cell count and CRP were in the normal range, the liver parameters were slightly elevated. Fluorine-18-FDG PET/CT was performed due to evaluation of FUO. One larger ¹⁸F-FDG avid lesion in segment VIII of the right liver lobe presented SUV=7.6, at least one small satellite could be observed (a). This lesion measured 2.0cm on PET/CT (b, c). Later on, various blood cultures were reported positive for *Brucella melitensis*. The patient remembered to have participated in a barbecue at a family celebration in her Bosnian home village in spring 2020, for which meat of sheep and goat had been prepared.

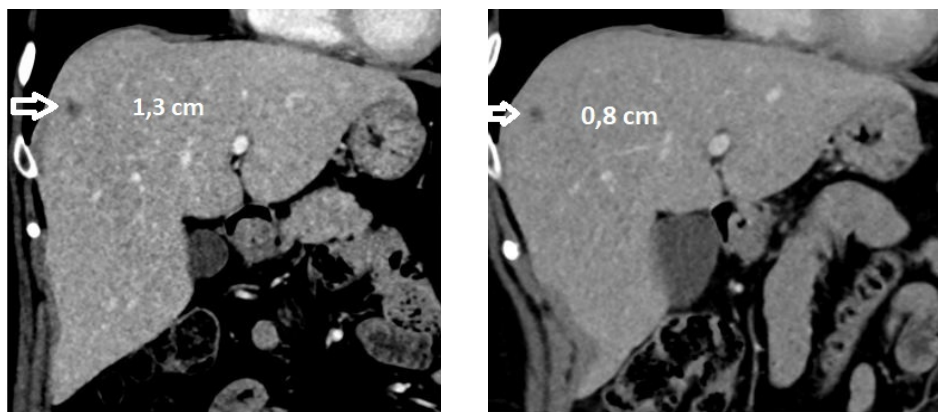


Figure 2. The patient received therapy with Vibramycin and Rifoldin, her symptoms consecutively diminished. On monthly CT control imaging the principal lesion measured 1.35cm (a) and 8mm in September 2020 (b), further controls by sonography could not detect it any more. Latest contact with our hospital was in July 2022, she had clinically completely resolved and laboratory parameters were negative for infection.

patient had a medical history of cancer some considerations for possible liver metastases occurred. Nevertheless the favourable course after the start of therapy made histological evaluation unnecessary. Now we have reached an observational period of two years, the liver lesions being undetectable via sonography in the meanwhile.

This case also stresses the importance of ^{18}F -FDG PET to detect even unexpected infectious agents [9].

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